

**Notice of Allowability**

Application No.

10/080,742

Examiner

Ayal I. Sharon

Applicant(s)

OLHOFFER ET AL.

Art Unit

2123

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed 12/18/2006.
2. ☒ The allowed claim(s) is/are 1-22.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 1/4/2007
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

## **DETAILED ACTION**

### ***Introduction***

1. Claims 1-22 of U.S. Application 10/080,742 are currently pending.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/18/2006 has been entered.

### ***Drawings***

3. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings are required since the application is allowed.
4. Figure 1 contains handwriting and illegible dark objects.
5. Figure 3 contains illegible dark objects.
6. Figure 6 contains illegible small typeface.

***Examiner's Amendment***

7. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
8. Authorization for this examiner's amendment was given in a telephone interview with Mr. John McNelis, Reg. No. 37,186 on 2/20/07.
9. Claim 12, line 13 in the application has been amended as follows:  
The phrase  
    "size of the mutation"  
has been changed to  
    ---- size of the modification ----
10. The antecedent basis for the term "modification" is found in Claim 12, line 7.

***Examiner's Statement of Reasons for Allowance***

11. Claims 1-22 are allowed.
12. The following is an examiner's statement of reasons for allowance for claims 1-22.
13. Examiner finds that Applicants' amendments to the claims overcome the 35 U.S.C. §§ 112 and 101 rejections, as argued by the Applicants on pp.8-9 of the amendment filed 12/18/2006.
14. The prior art referred to in this Reasons for Allowance is as follows:

- a. Bäck, T. et al. "Evolutionary Computation: Comments on the History and Current State." IEEE Transactions on Evolutionary Computation, April 1997. Vol.1, No.1, pp.3-17. (Hereinafter "Bäck").

15. The Applicants persuasively argue the following in the amendment filed

12/18/2006 (see pp.11-12. Emphasis in the original):

In independent claims 1, 12 and 17, the number and/or position of object parameters and/or strategy parameters are changed during the optimization. As recited in claim 1, the number (amount) of object parameters and the number (amount) of associated strategy parameters is changed during the optimization. As recited in claim 12, offsprings [sic] of the parameter set are created by modifying or mutating the number of object parameters as well as the structure of the parameter set, wherein the structure of the parameter set is defined by the number and position of the object parameters and strategy parameters. As recited in claim 17, offsprings [sic] of the parameter set are created by inserting a control point and inserting an additional strategy parameter in the parameter set.

In contrast Bäck teaches that the number of strategy parameters, for example, is kept constant and therefore teaches away from the present invention. This is shown on page 7, column 1, line 8 of Bäck which defines the number of strategy parameters as being equal to "n." These "n" number of strategy parameters are then mutated by adding a standard deviation as shown in Figure 6. Applicants note that this mutation changes the values of the strategy parameters but does not change the amount or number of strategy parameters, i.e., there are still "n" strategy parameters. This is also clearly stated beginning at the last paragraph on page 7, column 1 where Bäck states that "This mutation scheme .... is schematically depicted (for n = 2) in the middle of Fig. 2 ..... In the case considered here, i.e., up to n variances..." (emphasis added). This paragraph teaches that the number of parameters is set to "n" (in this example n = 2) and then they are mutated such that there are up to n variances. That is, the number of strategy parameter variances can not exceed "n" which teaches away from the claimed invention where the number (amount) of strategy parameters and/or object parameters is modified.

16. Examiner finds that Applicants' arguments persuasively distinguish the

independent claims from the Bäck reference.

17. The Examiner has located the following references authored by different inventive entities than the instant application, however, none of these reference can be applied as prior art due to their later publication date, or later U.S.

Application filing date.

- a. Olhofer, M., Y. Jin and B. Sendhoff. "Adaptive Encoding for Aerodynamic Shape Optimization Using Evolution Strategies." Proceedings of IEEE Congress on Evolutionary Computation. May 2001. Vol.1, pp.576-583. (See especially Section 3.1 on p.579, which teaches the use of mutative adaptation of a vector of strategy parameters, a spline curve, and the result of turbine blade designs at Figures 1,2,3 and 8).
- b. Jin, Y., M. Olhofer, and B. Sendhoff. "A Framework for Evolutionary Optimization with Approximate Fitness Functions." IEEE Transactions on Evolutionary Computation. 2002. Vol.6, Ed. 5, pp.481-494. (See especially Section II.A. on p.483, which teaches an evolution strategy with covariance matrix adaptation).
- c. U.S. Patent 7,043,462 to Jin et al. (The U.S. filing date of the issued patent is later than the foreign priority date of the instant application. See col.4, line 62 to col.5, line 62 of an evolutionary strategy that "operates on an n-dimensional vector."
- d. U.S. PG-PUB 2002/0099929 to Jin et al. (The U.S. filing date of the Jin application is later than the foreign priority date of the instant application.

See paragraphs [0040] to [00443] for a discussion of an evolutionary strategy on an n-parameter matrix).

- e. EP 1,205,877 to Jin and Sendhoff. (Priority document to the Jin patent).
- f. EP 1,205,863 to Jin and Sendhoff. (Priority document to the Jin PG-PUB).
- g. Nashvili, M., M. Olhofer, and B. Sendhoff. "Morphing Methods in Evolutionary Design Optimization." Genetic and Evolutionary Computation Conference (GECCO '05). June 25-29, 2005. pp.897-904.
- h. Hasenjäger, M., T. Sonoda, B. Sendhoff, and T. Arima. "Three Dimensional Evolutionary Aerodynamic Design Optimization with CMA-ES." Genetic and Evolutionary Computation Conference (GECCO '05). June 25-29, 2005. pp.2173-2180.

18. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is

Art Unit: 2123

(571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (571) 273-8300, or mailed to:


USPTO  
P.O. Box 1450  
Alexandria, VA 22313-1450

or hand carried to:

USPTO  
Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon  
Art Unit 2123  
February 20, 2007

  
PAUL RODRIGUEZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100